UNITED
NATIONS

A

General Assembly

Distr.
GENERAL

A/48/339
19 October 1993

ORIGINAL: ENGLISH

Forty-eighth session
Agenda item 82

IMPLEMENTATION OF THE DECLARATION ON THE DENUCLEARIZATION OF AFRICA

Report of the Secretary-General

CONTENTS

	Paragraphs	Page
INTRODUCTION	1 - 3	2

Annexes

I. An African nuclear-weapon-free zone: Resolution GC(XXXVII)/RES/625 adopted by the General Conference of the International Atomic Energy Agency 3

II. Denuclearization of Africa: Report by the Director General of the International Atomic Energy Agency 5

INTRODUCTION

1. At its forty-seventh session, the General Assembly adopted resolution 47/76, entitled "Implementation of the Declaration on the Denuclearization of Africa", in which the Assembly, inter alia, requested "the Secretary-General to report to the General Assembly at its forty-eighth session on the progress made by the Director General of the International Atomic Energy Agency in ensuring the full implementation of the safeguards agreement with South Africa".

2. The present report is submitted by the Secretary-General pursuant to the request.

3. As requested, the Secretary-General contacted the Director General of the International Atomic Energy Agency in order to obtain the required information. The information provided is contained in annexes I and II to the present report.

ANNEX I

An African nuclear-weapon-free zone

Resolution GC(XXXVII)/RES/625 adopted by the General Conference of the International Atomic Energy Agency at the 362nd plenary meeting on 1 October 1993

The General Conference,

(a) Recalling its resolutions GC(XXVII)/RES/408, GC(XXVIII)/RES/423, GC(XXIX)/RES/442, GC(XXX)/RES/468, GC(XXXI)/RES/485, GC(XXXII)/RES/503, GC(XXXIII)/RES/524, GC(XXXIV)/RES/545, GC(XXXV)/RES/567 and GC(XXXVI)/RES/577,

(b) Taking note of the fact that the South African Government acceded to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) on 10 July 1991 and that its safeguards agreement with the Agency in connection with the Treaty entered into force on 16 September 1991, as well as of its commitment to early and full implementation of this agreement,

(c) Also taking note of the announcement by South Africa that it had voluntarily abandoned its nuclear deterrent capability before accession to the NPT, and of its standing invitation to the Agency to inspect past nuclear weapon programme activities and facilities and to verify its full disclosure,

(d) Recognizing that the full disclosure of South Africa's nuclear facilities and materials is a contributing factor to the peace and security of the region and to the current efforts aimed at the establishment of a nuclear-weapon-free zone (NWFZ) in Africa, on the basis of the Declaration on the Denuclearization of Africa adopted by the Organization of African Unity (OAU) at its first ordinary session, held at Cairo from 17 to 21 July 1964, and of resolution A/RES/46/34.B adopted on 9 December 1991 by the General Assembly of the United Nations,

(c) Welcoming the progress made at the third meeting of the UN/OAU Group of Experts to draft a treaty on an African Nuclear-Weapon-Free Zone, which was held in Harare from 5 to 8 April 1993,

1. Takes note of the report of the Director General on the Agency's verification activities in South Africa contained in document GC(XXXVII)/1075;

2. Requests South Africa to continue its stated policy of full transparency;

3. Commends the African States in their efforts directed towards the establishment of an African Nuclear-Weapon-Free Zone and requests the Director General to continue to assist them in these efforts; and

4. Further requests the Director General to report on the progress made in implementing this resolution to the Board of Governors and to the General Conference at its thirty-eighth regular session under an agenda item entitled "An African Nuclear-Weapon-Free Zone".

ANNEX II

Denuclearization of Africa

Report by the Director General

of the International Atomic Energy Agency

1. In resolution GC(XXXVI)/RES/577, the General Conference last year:

(a) Took note "of the report of the Director General on the implementation of the safeguards agreement between the South African Government and the Agency, including the verification of the completeness of the inventory of South Africa's nuclear installations and material, pursuant to General Conference resolution GC(XXXV)/RES/567";

(b) Requested "South Africa to continue to co-operate with the Agency in the implementation of the safeguards agreement"; and

(c) Requested the Director General "to assist the African States in their efforts towards the establishment of a NWFZ in Africa".

2. The resolution further requested the Director General "to report on the progress made in implementing this resolution to the Board of Governors and to the General Conference at its thirty-seventh regular session under an agenda item entitled "The Denuclearization of Africa".

3. Accordingly, the attached report covers (i) the Agency's verification activities in South Africa (appendix I); and (ii) Assistance to African States in their efforts towards the establishment of a Nuclear-Weapon-Free Zone in Africa (appendix II).

Appendix I

THE AGENCY'S VERIFICATION ACTIVITIES IN SOUTH AFRICA

GENERAL BACKGROUND

1. In resolution GC(XXXV)/RES/567 the Director General was requested "to ensure early implementation of the safeguards agreement" concluded pursuant to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) between the Republic of South Africa and the Agency on 16 September 1991 (INFCIRC/394) and "to verify the completeness of the inventory of South Africa's nuclear installations and material". Accordingly, a report on the completeness of the inventory of South Africa's nuclear installations and material, document GC(XXXVI)/1015, dated 4 September 1992, was submitted to the General Conference in 1992 and the Conference in resolution GC(XXXVI)/RES/577, inter alia, requested South Africa to continue to co-operate with the Agency in the implementation of the safeguards agreement. Following South Africa's announcement of its abandoned nuclear weapons programme a report on related Agency activities, document GOV/INF/698, dated 27 May 1993, was submitted to the Board of Governors. In discussions on that report, at the June 1993 meeting of the Board of Governors, the Director General was requested to inform the Board about the progress of the Agency's verification activities in South Africa.

2. The present document reports the progress made in implementing the safeguards agreement, including the verification of the completeness of the inventory of South Africa's nuclear installations and material, and also contains the Agency's assessment of the status of South Africa's former nuclear weapons programme.

IMPLEMENTATION OF THE SAFEGUARDS AGREEMENT

3. Following the entry into force of the safeguards agreement the initial report on the inventory of nuclear material in all nuclear facilities and locations outside facilities, as of 30 September 1991, was submitted to the Agency on 30 October 1991. Implementation of the safeguards agreement commenced, with ad hoc inspections, in November 1991 since which time the Agency has carried out 22 inspection missions in South Africa. These inspection missions, scheduled at monthly intervals, have involved more than 150 inspections at individual facilities and locations outside facilities. The safeguards criteria 1991-1995 have been fully implemented since the beginning of 1992 and the quantity component of the

inspection goal was achieved for all nuclear material subject to the safeguards agreement in all nuclear facilities during that year. In this connection near-simultaneous physical inventory verifications were carried out in August 1992 and will be repeated in October 1993.

4. The general part of the subsidiary arrangements entered into force on 20 August 1992 and since that time six facility attachments have entered into force. Work is in progress on the remaining eight facility attachments. The South African authorities have provided extensive co-operation to the Agency in the implementation of safeguards.

5. A team of senior members of the Department of Safeguards was appointed by the Director General in November 1991 to verify the completeness of the inventory of South Africa's nuclear installations and material. In GC(XXXVI)/1015 it was stated that "the team found no evidence that the list of facilities and locations outside facilities provided by South Africa in its initial report, as required by the safeguards agreement, was incomplete" and that "the team found no evidence that the inventory of nuclear material included in the initial report was incomplete". The team however also reported that the uranium-235 balances they had calculated for both the pilot enrichment plant and the semi-commercial enrichment plant showed apparent discrepancies.

6. Since document GC(XXXVI)/1015 was issued there have been four additional visits by members of the team to South Africa with the objective, inter alia, to further examine the apparent discrepancies with particular reference to the uranium-235 balance associated with the high enriched uranium (HEU) produced by the pilot enrichment plant. Through consultations with officials of the Atomic Energy Corporation (AEC) and detailed re-examination of the historical records of specific periods of operation and intervening shutdown periods, since the start-up of the pilot enrichment plant, the team has obtained clarifications which have resulted in substantial reduction of the magnitude of the apparent discrepancy in the uranium-235 balance associated with this plant. Having regard to the uncertainties normally associated with data of this nature, it is reasonable to conclude that the uranium-235 balance of the high enriched uranium, low enriched uranium and depleted uranium produced by the pilot enrichment plant is consistent with the uranium feed.

7. In addition, the team has assessed the consistency of the declared HEU product with the production capacity of the pilot enrichment plant. In the course of the assessment, the team examined many thousands of records relating to the operation of the plant and

intervening shutdown periods. The AEC also provided copies of several thousand such records to the Agency along with specimens of original records and copies of technical reports, produced during the lifetime of the pilot enrichment plant; these reports describe phenomena, such as chemical losses, which were unique to the process gas mixture and the plant construction materials and which influenced the output of the plant.

8. From the team's assessment of the production capacity of the pilot enrichment plant, on the basis of operating records and supporting technical data provided to the team by the AEC, it is reasonable to conclude that the amounts of HEU which could have been produced by the pilot enrichment plant are consistent with the amounts declared in the initial report.

9. Lower priority has been assigned to the team's activities concerned with the examination of the apparent discrepancy in the uranium-235 balance associated with the semi-commercial enrichment plant which is designed to produce low enriched uranium. Efforts to clarify this apparent discrepancy will now proceed. The necessary activities will, to the extent possible, be carried out in conjunction with regular inspection activities and the results will be evaluated by the team.

ASSESSMENT OF THE STATUS OF SOUTH AFRICA'S FORMER NUCLEAR WEAPONS PROGRAMME

Objectives

10. In conjunction with the activities described in paragraphs 5 to 9 above and at the invitation of the South African Government, the team, assisted by nuclear weapons experts, has carried out an assessment of the status of South Africa's former nuclear weapons programme with particular respect to its origin, scope and the adequacy of the measures taken to dismantle and destroy sensitive components of the weapons and to recover the nuclear material involved. The initial objectives of the team, described in document GOV/INF/698, were augmented as follows:

i) To gain assurance that all nuclear material used in the nuclear weapons programme had been returned to peaceful usage and had been placed under IAEA safeguards;

ii) To assess that:

- all non-nuclear weapons-specific components of the devices had been destroyed;

- all laboratory and engineering facilities involved in the programme had been fully decommissioned and abandoned or converted to peaceful usage (commercial non-nuclear usage or peaceful nuclear usage);

- all weapons-specific equipment had been destroyed and that all other equipment had been converted to peaceful usage;

iii) To obtain information regarding the dismantling programme, the destruction of design and manufacturing information, including drawings, and the philosophy followed in the destruction of the nuclear weapons;

iv) To assess the completeness and correctness of the information provided by South Africa with respect to the timing and scope of the nuclear weapons programme and the development, manufacture and subsequent dismantling of the nuclear weapons;

v) To consult on the arrangements for, and ultimately to witness, the rendering useless of the Kalahari test shafts;

vi) To visit facilities previously involved in or associated with the nuclear weapons programme and to confirm that they are no longer being used for such purposes;

vii) To consult on future strategies for maintaining assurance that the nuclear weapons capability would not be regenerated.

11. These objectives were based on the Agency's rights and obligations under the safeguards agreement and on the stated policy of the South African Government for full transparency with respect to the country's former nuclear weapons programme. The team had extensive discussions with the South African authorities and technical staff at the AEC and at the state owned National Armaments Corporation (ARMSCOR) who had been in charge of the nuclear weapons programme. Detailed briefings were provided on the various phases of the programme and on the associated development and production facilities. Information on the future developments of the programme which had been envisaged before the order to dismantle the nuclear weapons programme intervened was also provided.

Timing and scope of the nuclear weapons programme

12. The following paragraphs (13 through 20) provide a summary of the timing and scope of the nuclear weapons programme compiled by the team on the basis of official documents, programme records and information obtained through interviews with principal personnel at the various facilities and locations involved in the programme. A chronology of the main events in the nuclear weapons programme is attached as attachment 1.

13. An internal committee of the South African Atomic Energy Board, a predecessor of the AEC, was appointed in 1969 to investigate the economic and technical aspects of the peaceful uses of nuclear explosives with particular reference to South Africa's mining industry. In March 1971, in accordance with the recommendations of this committee, permission was given to the AEC, by the Minister of Mining, to commence secret research and development work on nuclear explosive devices. In 1974, the then Prime Minister, approved a redefinition of the objectives of the research and development work which transferred the emphasis to a limited nuclear weapons deterrent programme.

14. In the ensuing years, up to 1977, the AEC developed computer programmes (internal ballistic and neutronic codes), carried out experiments to determine equations-of-state of materials, designed and constructed a critical facility and carried out work with gun propellants. This phase of the programme resulted in the production, in mid-1977, of a gun-assembled device, without the HEU core. Parallel activities had commenced in 1973 with a view to locating a suitable test site and by November 1976 the first test shaft had been completed at a site, in the Kalahari desert, at Vastrap, north of Upington. A second test shaft was completed on the same site in 1977, shortly after which the site was abandoned.

15. Work had started in the 1960s on the development of an indigenous method for uranium enrichment. This work resulted in the design, construction and commissioning of the pilot enrichment plant which commenced full operation in 1977 and by the second half of 1979 had produced sufficient HEU material for the first nuclear device. This device was completed by the AEC in November 1979 and was designed in such a way that, if the need arose, it could be rapidly deployed for an underground test to demonstrate South Africa's nuclear weapons capability. Its purpose remained that of a demonstration device throughout the programme; it was never converted to a deliverable device.

16. In 1979 the responsibility for the nuclear weapons programme was transferred to ARMSCOR while the AEC was made responsible for the production and supply of HEU and for theoretical studies and development work in nuclear weapons technology. ARMSCOR's nuclear weapons activities were headquartered in facilities, known as the Circle, located some 15 kilometers away from the AEC's establishment at Pelindaba. The Circle facilities were constructed during 1980 on the basis of designs provided by the AEC and were commissioned in May 1981. The nuclear weapons programme, thus established, involved:

- the development and production of a number of deliverable gun-assembled devices;

- lithium-6 separation for the production of tritium for possible future use in boosted devices;

- studies of implosion and thermonuclear technology;

- research and development for the production and recovery of plutonium and tritium.

This last mentioned activity was to include the design and construction of a reactor to be built at a site at Gouriqua, near Mosselbay in the Cape Province. Plans for this site were revised in the course of the nuclear weapons programme such that the final option would have involved the construction of a 150 MW pressurised water research and development reactor, retaining the capability for plutonium and tritium production. Beyond some rudimentary civil engineering preparations the site was never developed; it was recently sold by the AEC to a private purchaser.

17. In the period following the 1979 decision to transfer, to ARMSCOR, the responsibility for the production of the nuclear weapons, the AEC's contribution to the programme involved work on miniaturised neutron generators for potential use as initiators for the nuclear weapons and theoretical and practical research and development work on lithium-6 separation for the possible production of tritium. The AEC also carried out theoretical and basic development work on the use of tritium for the boosting of gun-assembled devices. The team was informed that no tritium was actually used in this work. The AEC had received some tritium in 1977, but after the withdrawal of a small sample for the verification of its quality, the material remained in store until 1987, when it was used for the commercial production of radioluminescent light sources. The AEC also established facilities and techniques for the handling of transuranium elements based on development

work using americium and neptunium. These facilities and techniques were used to recover the plutonium from a damaged plutonium/beryllium neutron source. The recovered plutonium was recorded in the initial report.

18. In September 1985 the South African Government decided to limit the scope of the programme to the production of seven gun-assembled devices, to stop all work related to possible plutonium devices and to limit the production of lithium-6, but to allow further development work on implosion technology and theoretical work on more advanced devices. The first prototype deliverable device had been completed in December 1982, but it was not until August 1987 that the first qualified production model was completed. The delay was largely due to the implementation of a rigorous engineering qualification programme directed towards safety and security under a range of postulated storage, delivery and accident scenarios. When, in November 1989, the decision was taken by the Government to stop the production of nuclear weapons, four further qualified deliverable gun-assembled devices had been completed and the HEU core and some non-nuclear components for a seventh device had been fabricated. On 26 February 1990 the State President issued a written instruction that, inter alia, all existing nuclear devices were to be dismantled and the nuclear materials melted down and returned to the AEC in preparation for South Africa's accession to the NPT.

19. A steering committee was established by the Government of South Africa to evaluate and approve the procedures to be followed in the dismantling of the weapons and in the dismantling and decontamination of the related facilities. These procedures included provisions for the destruction of the sensitive weapons components and design information. The dismantling programme was approved by the State President in July 1990 and by 6 September 1991 all of the HEU had been removed from the weapons, melted down and returned from ARMSCOR to the AEC. Prior to the entry into force of the safeguards agreement, on 16 September 1991, the ARMSCOR/Circle facilities had been completely decontaminated and the equipment that had been used for the melting and casting of HEU had been transferred to the AEC. By 23 March 1993 most of the classified documents had been destroyed and the sensitive weapons components had either been destroyed or damaged beyond re-use.

20. It is a matter of public record that on 24 March 1993 the South African State President announced the former existence and the subsequent abandonment of South Africa's nuclear weapons capability. At that time two members of the Agency team were present

at the AEC for the purpose of carrying out follow-up actions relating to the verification of the completeness of the inventory of South Africa's nuclear installations and material. On 25 March 1993 these team members made a preliminary visit to some of the main facilities involved in the former nuclear weapons programme.

Dismantling and destruction of the nuclear weapons

21. By the time of the team's visit in April 1993, the dismantling and destruction of weapons components and the destruction of the technical documentation had been nearly completed. Dismantling records concerning the HEU components of the weapons were available and provided sufficient detail to enable the ARMSCOR data to be correlated with the corresponding data in the nuclear material accountancy records maintained by the AEC. No records were available with respect to the amounts of natural and depleted uranium used in the experimental devices. The team was informed that neither the AEC nor ARMSCOR/Circle had kept any records with respect to such material transferred to the nuclear weapons programme, on the grounds that natural and depleted uranium had been considered ordinary metal with little nuclear significance or financial value.

22. The dismantling of the non-nuclear components of the weapons was carried out in accordance with procedures approved by the South African authorities. The various mechanical, electrical and pyrotechnic components were categorised according to their design sensitivity and instructions were given requiring that sensitive components were either to be broken down for storage as raw materials or non-sensitive parts or destroyed by cutting and melting or, in the case of pyrotechnic components, by detonation. The dismantling records comprised brief hand-written listings of component systems dismantled from the deliverable devices. The team was informed that no records had been kept documenting the dismantling of the components of the demonstration device or any of the pre-production experimental devices or on the destruction of their components. A number of destroyed or partially destroyed components had been retained and were shown to some members of the team in April 1993. Remaining records, in the form of "build-history" log books for the completed weapons and the experimental devices, were examined and compared with the dismantling listings. The identification numbers of the remaining components were compared and found to be consistent with those shown in the records.

23. The team recommended the complete destruction of those remaining components, photographs and drawings which could reveal significant dimensions or the design of the

nuclear material core and any components that would simplify engineering design or reveal dimensions of other sensitive components. Illustrative examples of such components were indicated by the team. In this context the team stated that the term "destruction" should be taken to mean that the critical dimensions of destroyed components would no longer be measurable or reproducible, that the intended function would no longer be recognisable or that a destroyed item could not be reconstituted faster or more economically than it could be redesigned or rebuilt. The team recommended that the archive records be retained for three months to allow for any further clarification that might be required, after which they should also be destroyed.

Recovery of nuclear material and its return to peaceful usage

24. The team carried out an audit of the records of the transfer of weapons-grade HEU between the AEC and ARMSCOR/Circle. As a result of this audit, the team concluded that the HEU originally supplied to ARMSCOR/Circle had been returned to the AEC and was subject to Agency safeguards at the time of entry into force of the safeguards agreement. The audit of the records relating to the transfer of HEU between the AEC and ARMSCOR/Circle for the manufacture of uranium/aluminum alloy for fuel for the SAFARI-1 research reactor resulted in a similar conclusion. The team verified the depleted and natural uranium transferred back to the AEC from ARMSCOR/Circle after the abandonment of the nuclear weapons programme and found it to be consistent with the summary records provided, but no records were available covering the transfer of such material during the programme.

Facilities involved in the nuclear weapons programme

25. A complete list of the facilities visited in connection with the assessment of the status of the former nuclear weapons programme is in attachment 2. It is appropriate to record the active co-operation of the South African authorities in arranging for access to all facilities that the team requested to visit - both those facilities which had been provisionally listed by the South African authorities as having direct connection with the former nuclear weapons programme or with peripheral activities and additional facilities identified by the team. The Secretariat is not in possession of any information suggesting the existence of any undeclared facilities.

Rendering useless the test shafts at the Kalahari site

26. The Agency and the South African authorities agreed that the tests shafts could be considered to have been rendered useless when, as a direct result of the measures taken, their reconstitution would be more difficult or expensive than the construction of new facilities. A plan for the rendering useless of the test shafts, incorporating specific suggestions made by the Agency team, was prepared by ARMSCOR and initiated in June 1993. Although the implementation of this plan met with some initial practical difficulties, the measures to render useless the test shafts were successfully completed during the period from 26 to 30 July 1993 and were witnessed by Agency safeguards inspectors. Members of the team visited the Kalahari site on 11 August 1993 and concluded that the measures taken, which had involved back-filling with sand and the casting in place of reinforced concrete plugs at various levels, had rendered useless the test shafts.

Equipment used in the nuclear weapons programme

27. The equipment used for uranium metallurgy at ARMSCOR/Circle had been returned to the AEC at the end of the programme. The whole uranium metallurgy process area at ARMSCOR/Circle had been dismantled and decontaminated. The machine tools used for manufacturing the HEU and high explosives components had been decontaminated and are now available for commercial non-nuclear applications. The South African authorities stated that specialised equipment supporting the weapon systems in the form of computerised testing equipment has been rendered useless through the destruction of the specific software. The equipment used in connection with the Kalahari test shafts is standard equipment, except for the cages for personnel and cameras, which the team suggested should be scrapped.

GENERAL CONCLUSIONS

28. The status of the implementation of the safeguards agreement between the Republic of South Africa and the Agency is satisfactory and it is expected that all outstanding facility attachments will enter into force during 1994. No practical difficulties have been encountered which would impede the attainment of inspection goals. Inspection activities to clarify the apparent discrepancy in the uranium-235 balance associated with the low enriched uranium produced by the semi-commercial enrichment plant will now proceed and the results obtained will be evaluated by the team.

29. The magnitude of the apparent discrepancy in the uranium-235 balance associated with the pilot enrichment plant has been reduced to such a level that, having regard to the normal

uncertainties expected to be involved in the plant historical operating and accounting records, it is reasonable to conclude that the uranium-235 balance of the high enriched uranium, low enriched uranium and depleted uranium produced by the pilot enrichment plant is consistent with the uranium feed. Assessment of the production capacity of the pilot enrichment plant, on the basis of operating records and supporting technical data provided to the team by the AEC, indicates that it is reasonable to conclude that the amounts of HEU which could have been produced by the plant are consistent with the amounts declared in the initial report.

30. The team's audit of the associated records indicated that all of the HEU provided by the AEC to the nuclear weapons programme had been returned to the AEC and was subject to Agency safeguards at the time of entry into force of the safeguards agreement. Similarly all of the enriched material produced by the AEC and processed at the ARMSCOR/Circle facilities, in connection with the manufacture of fuel for the SAFARI-1 research reactor, had been returned to the AEC and was subject to Agency safeguards at the time of entry into force of the safeguards agreement. There was no indication to suggest that substantial amounts of depleted or natural uranium used in the nuclear weapons programme are unaccounted for.

31. The findings from the team's examination of records, facilities and remaining non-nuclear components of the dismantled/destroyed nuclear weapons and from the team's evaluation of the amount of HEU produced by the pilot enrichment plant are consistent with the declared scope of the nuclear weapons programme. The team found no indication to suggest that there remain any sensitive components of the nuclear weapons programme which have not been either rendered useless or converted to commercial non-nuclear applications or peaceful nuclear usage.

32. In the future, and without prejudice to the Agency's rights under the safeguards agreement, the Agency plans to utilise the standing invitation of the South African Government - under its reiterated policy of transparency - to provide the Agency with full access to any location or facility associated with the former nuclear weapons programme, and to request access on a case-by-case basis to other locations or facilities that the Agency may specifically wish to visit.

Attachment 1

CHRONOLOGY OF THE MAIN EVENTS IN THE NUCLEAR WEAPONS PROGRAMME

1970	Uranium enrichment project announced
1971	Approval for R&D based on gun-assembled device relating to nuclear explosions for peaceful purposes
1973	Investigation into separation of lithium isotopes
1974	Prime Minister approves limited programme for development of nuclear weapons as deterrent First stage of pilot enrichment plant commissioned Approval for test site development in Kalahari desert
1975	Work on Kalahari test shafts commenced
1976	Export from USA of fuel for SAFARI-1 research reactor stopped
1977	Kalahari test site abandoned Full cascaded operation of the pilot enrichment plant
1978	First HEU product withdrawn from the pilot enrichment plant
1979	First nuclear device completed by the AEC Decision that ARMSCOR should take over programme and produce all further devices
1980	Construction of tritium handling laboratory completed
1981	ARMSCOR/Circle facilities completed Approval of Gouriqua programme for commercial PWR technology development, as well as possible future tritium and plutonium production
1982	Second device completed
1985	Government decision to limit number and type of devices to seven gun-assembled devices, to further develop implosion technology and to study more advanced concepts lithium-6 Avlis programme redirected towards lithium-7 production for water chemistry control in commercial power reactors
1987	Commercial programme for tritium radioluminescent light sources started
1987-89	Completion of four additional devices
1989-91	Construction of facilities at ARMSCOR/Advena Central Laboratories
1989	Decision to terminate nuclear weapons programme (November) Gouriqua programme stopped
1990	Pilot enrichment plant ceased operation (February) Order by State President for destruction of the six completed nuclear devices and the incomplete seventh device (26 February)
1991	Accession to the NPT (10 July) All HEU returned from ARMSCOR/Circle to the AEC (14 March - 6 September) Signature and entry into force of the safeguards agreement (16 September) Initial report submitted (30 October) Ad hoc inspections start (November)
1993	Destruction of documentation relating to nuclear weapons programme ordered by State President on 17 March; destruction completed on 23 March State President's announcement in Parliament of the existence and subsequent abandonment of the former nuclear weapons programme (24 March) Preliminary visit by Agency team members to the ARMSCOR/Circle facilities (25 March) Visits of the Agency team to assess the status of the former nuclear weapons programme (22 April - 4 May, 3 - 11 June and 9 - 13 August)

Attachment 2

FACILITIES VISITED BY THE AGENCY TEAM

The facilities visited by members of the team during the assessment of the status of the former nuclear weapons programme included:

(a) The buildings of the AEC establishment at Pelindaba where the initial research and development phase took place and the first demonstration nuclear device was manufactured, as well as the buildings where the HEU and the uranium metal were produced and the laboratories involved with the tritium and lithium-6 programme and the development work on neutron generators.

(b) The ARMSCOR/Circle establishment near Pelindaba where the first device was ultimately stored and the five other completed devices were manufactured, assembled and stored. This establishment included the high security vaults where the six completed devices and the enriched uranium necessary for a seventh device were stored, high explosive test cells, nuclear material casting and machining workshops (now dismantled), conventional workshops for the production of mechanical and electrical components and an environmental testing facility.

(c) The facilities of the ARMSCOR/Advena Central Laboratories near the ARMSCOR/Circle establishment, which were intended for further nuclear weapons development work on advanced gun-assembled and implosion-type devices. The facilities included bunkers for explosives processing and testing, an "integration building" for advanced weapons assembly and integration with delivery systems, high-security storage vaults and an explosion test chamber. These facilities were just being completed at the time the programme was cancelled and played little role in the programme.

(d) An explosives test facility, including a small instrumentation bunker, located on military property near Potchefstroom.

(e) A purpose-built high-security vault, in a military ammunition depot at Roedtan, which had been intended for the storage of nuclear devices.

(f) An abandoned coal mine, at Witbank, which had been used as a military ammunitions depot and where the first device had been temporarily stored.

(g) The Vastrap site in the Kalahari desert, now being used by the South African Air Force as a firing range, where the two shafts prepared for underground testing of the devices were located. The shafts have now been rendered useless.

(h) ARMSCOR facilities at the Kentron Central Factory near Pretoria, at Naschem, near Boskop, and at the Somchem establishment in the Cape Province. It was at the propulsion laboratory of Somchem, in 1972/1973, that a small team of AEC personnel carried out research and development work on the mechanical and pyrotechnic sub-systems of nuclear devices. The experience gained through this work enabled the AEC to design a scale model of a gun-assembled device. This first model utilized a projectile made from non-nuclear material and was tested for the first time in May 1974. The first full-scale experimental set-up with a natural uranium projectile was tested at this facility during 1976 and proved the mechanical integrity of the design. All activities were moved from Somchem to Pelindaba during 1977.

(i) The site at Gouriqua, in the Cape Province, where it was planned to build a reactor facility for the possible production of plutonium and tritium. Beyond some rudimentary civil engineering preparations, the site was never developed; it was recently been sold by the AEC to a private purchaser.

(j) The Alkantpan firing range, in the Cape Province, where some development work had been undertaken on heavy metal armour penetrators, involving a small number of test firings using depleted uranium and shaped charges. Although there are common areas between this technology and implosion technology, the team found no apparent link between the Alkantpan test range and the former nuclear weapons programme. The diagnostic facilities at Alkantpan were not considered to be particularly useful to a nuclear weapons development programme.

Appendix II

ASSISTANCE TO AFRICAN STATES IN THEIR EFFORTS TOWARDS THE ESTABLISHMENT OF A NUCLEAR WEAPON FREE ZONE IN AFRICA

1. The request to the Director General in resolution GC(XXXVI)/RES/577 to assist African States in their efforts towards the establishment of a Nuclear-Weapon-Free Zone (NWFZ) in Africa must be seen in the context of United Nations resolutions on the matter.

2. Pursuant to resolutions 45/56 A of 4 December 1990 and 47/76 of 15 December 1992, meetings of experts were organized by the United Nations, in co-operation with the Organization of African Unity (OAU), in Addis Ababa, Ethiopia, from 6 to 10 May 1991, in Lome, Togo, from 28 to 30 April 1992 and in Harare, Zimbabwe from 5 to 8 April 1993. In addition to experts selected by the United Nations and the OAU, participants included representatives of African Governments. Also invited were representatives of some States Parties to the Treaty for the Prohibition of Nuclear Weapons in Latin America and to the South Pacific Nuclear-Free Zone Treaty.

3. At the invitation of the United Nations, the Secretariat participated in all meetings of the Expert Group. At the first two meetings, the experts noted the significance of making full use of the possibilities of co-operation and assistance offered to them by the IAEA. They noted in particular that, up to that time, a number of African countries had been unable fully to assess either the opportunities which could be provided through co-operation with the IAEA in the field of using nuclear energy for peaceful purposes or the potential role of the IAEA in ensuring adequate verification arrangements in any Treaty to make Africa a Nuclear-Weapon-Free Zone (NWFZ).

4. In its report to the United Nations General Assembly in 1991 in document A/C.1/46/9, the Group of Experts said that "all the States should declare their nuclear programmes and agree to subject them to verification procedures to be carried out within the framework of the Treaty by the OAU in co-operation with the IAEA." They also underlined the need for every State party to that Treaty "to enter into a full safeguards agreement with the IAEA."

5. Pursuant to resolution 47/76 of 15 December 1992, the United Nations General Assembly) inter alia, requested the Secretary General, in consultation with the OAU, "to take appropriate action to enable the Group of Experts designated by the United Nations in cooperation with the Organization of African Unity to meet during 1993 at Harare, in order to draw up a draft treaty or convention on the denuclearization of Africa, and to submit the report of the Group of Experts to the General Assembly at its forty-eighth session ".

6. The Secretariat was requested by the United Nations to nominate an expert to participate in the preparations for and the third meeting of the Expert Group, specifically by preparing draft Treaty provisions relevant to verification requirements in a future NWFZ in Africa . The Secretariat complied with these requests. The third meeting was held in Harare, from 5-8 April 1993.

7. At that meeting, the Expert Group considered, inter alia , the working text of a draft Treaty on a NWFZ in Africa. Although a substantial measure of agreement was reached on the draft, the group was unable , because of time constraints to complete its work. The group therefore agreed "to request the Secretary-General of the United Nations, in consultation with the OAU, to convene a further meeting of the UN/OAU Group of Experts, in order to enable the Group to finalize the drafting of a Treaty on a Nuclear-Weapon-Free Zone in Africa".

8. It is expected that, pursuant to resolution A/RES/47/76 of the United Nations General Assembly, the Chairman of the Third Meeting of the Group of Experts will submit the Group's report, including the draft text of a Treaty on a NWFZ in Africa to this year's meeting of the General Assembly.